Tactical Control System (TCS)

to

All Source Analysis System (ASAS)

Interface Design Description

Prepared for:
Program Executive Officer, Cruise Missiles Project
and Unmanned Air Vehicles Joint Project

Prepared by:
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1. Scope.

This Interface Design Description (IDD) defines the interface between the Tactical Control System (TCS) and the fielded All Source Analysis System (ASAS RWS V1 Rel RW2.1.1).

1.1 Identification.

This Tactical Control System (TCS) - Interface Design Description (IDD) version 1.0 identifies, specifies and establishes the detailed interface requirements for the TCS to ASAS RWS V1 Rel RW2.1.1 as set forth by the Operational Requirements Document (ORD) For The Unmanned Aerial Vehicle (UAV) Tactical Control System (TCS) - Version 5.0. This IDD is written to comply with ORD requirement number 069. This IDD specifies requirements levied on the TCS, and does not impose any requirements on the C^4I System addressed in this document. This IDD further specifies the methods to be used to ensure that each system interface requirement has been met. This IDD is published in accordance with Data Item Description (DID) DI-IPSC-81436, dated 941205, and modified to incorporate the qualification provisions section that is traditionally found in the Interface Requirements Specification (IRS). This IDD will be revised at the conclusion of the Program Definition and Risk Reduction period of the TCS program and will be re-issued in final form to be used during the follow-on TCS Engineering and Manufacturing Development period.

1.2 System Overview.

The purpose of the TCS is to provide the military services with a single command, control, data receipt, data processing, data export and dissemination device that is interoperable with the family of all present and future tactical unmanned aerial vehicles and designated Command, Control, Communication, Computers, and Intelligence (C^4I) systems.

These UAVs shall include the Tactical Unmanned Aerial Vehicle (TUAV) and the Medium Altitude Endurance (MAE) UAV (henceforth referred to as Outrider and Predator respectively), and their associated payloads. TCS will also be capable of receiving and processing information from High Altitude Endurance (HAE) UAVs, HAE UAV payloads, and with future tactical UAVs and payloads.

1.2.1 TCS Program, Phases, and UAV Interaction.

The Unmanned Aerial Vehicle Joint Project Office (UAV JPO) has undertaken development of a TCS for UAVs. Design and development of the TCS will be conducted in two phases. Phase 1 is defined as the Program Definition and Risk Reduction phase, and Phase 2 is defined as the Engineering and Manufacturing Development phase in accordance with Department Of Defense Instruction (DODI) - 5000.2R. During Phase 2, TCS Low Rate Initial Production (LRIP) will commence. Phase 1 will be a 24 month period and will demonstrate Level 1 through Level 5

interaction (as defined below) in an Incremental and Evolutionary strategy as described in accordance with MIL-STD-498. The five discrete levels of multiple UAV interaction to be provided by the TCS are:

Level 1: receipt and transmission of secondary imagery and/or data

Level 2: direct receipt of imagery and/or data

Level 3: control of the UAV payload in addition to direct receipt of imagery/data

Level 4: control of the UAV, less launch and recovery, plus all the functions of level three

Level 5: capability to have full function and control of the UAV from takeoff to landing

1.2.2 Tactical Control System Overview.

The TCS is the software, software related hardware and the extra ground support hardware necessary for the control of the TUAV, the MAE UAV, and future tactical UAVs. The TCS will also provide connectivity to specific C^4I systems. TCS will have the objective capability of receiving High Altitude Endurance (HAE) UAV payload information. Although developed as a total package, the TCS will be scaleable to meet the user's requirements for deployment. TCS will provide a common Human-Computer Interface (HCI) for tactical airborne platforms to simplify user operations and training, and facilitate seamless integration into the Services' joint C^4I infrastructure across all levels of interaction.

1.2.2.1 Software.

The major focus of the TCS program is software. The software will provide the UAV operator the necessary tools for computer related communications, mission tasking, mission planning, mission execution, data receipt, data processing, limited data exploitation, and data dissemination. The software will provide a high resolution computer generated graphics user interface that enables a UAV operator trained on one system to control different types of UAVs or UAV payloads with a minimum of additional training. The TCS will operate in an open architecture and be capable of being hosted on computers that are typically supported by the using Service. Software developed will be Defense Information Infrastructure / Common Operating Environment compliant, non-proprietary, and the architectural standard for all future tactical UAVs. To the extent possible, the TCS will use standard DoD software components to achieve commonality. TCS will provide software portability, scaleable functionality, and support for operational configurations tailored to the users' needs.

1.2.2.2 Hardware.

The TCS will use standard Department of Defense (DoD) components to the greatest extent possible in order to achieve maximum commonality. The TCS also will use the computing hardware specified by the Service-specific procurement contracts. The individual armed services will identify TCS computing hardware, the desired level of TCS functionality, the battlefield C^4I connectivity, and the particular type of air vehicle and payloads to be operated, and the TCS hardware must be capable of further being scaled or modularized to meet varying Service needs. TCS hardware will permit long range communications from one TCS to another, data storage expansion, access to other computers to share their processing capability, and multiple external peripherals.

1.2.2.3 System Compliance.

The TCS will be developed in compliance with the following military and commercial computing systems architecture, communications processing, and imagery architecture standards:

a) Department of Defense (DOD) (C^3I) Joint Technical Architecture (JTA), including but not limited to:
   1. Variable Message Format (VMF) and Joint Message Format (JMF)
   2. National Imagery Transmission Format (NITF)

b) Defense Information Infrastructure (DII) Common Operating Environment (COE)

c) Computer Open Systems Interface Processor (COSIP)

d) Common Imagery Ground/Surface System (CIGSS) Segment of Distributed Common Ground Station (DCGS)

1.2.2.4 Integration with Joint C^4I Systems.

The TCS will be capable of entering DII-COE compliant networks, and TCS integration with C^4I systems will be accomplished through development of interfaces that permit information exchange between the TCS and specified C^4I systems. Network interoperability will include but not be limited to:

Army Mission Planning System (AMPS)

Advanced Tomahawk Weapons Control System (ATWCS)

Advanced Field Artillery Tactical Data System (AFATDS)

Air Force Mission Support System (AFMSS)

All Source Analysis System (ASAS)

Automated Target Hand-off System (ATHS)

Closed Circuit Television (CCTV)

Common Operational Modeling, Planning, and Simulation Strategy (COMPASS)

Contingency Airborne Reconnaissance System (CARS)

Enhanced Tactical Radar Correlator (ETRAC)

Guardrail Common Sensor/Aerial Common Sensor (ACS) Integrated Processing Facility (IPF)

Intelligence Analysis System (IAS)

Joint Deployable Intelligence Support System (JDISS)

Joint Maritime Command Information System (JMCIS)

Joint Service Imagery Processing System - Air Force (JSIPS-AF)

Joint Service Imagery Processing System - Navy (JSIPS-N)

Joint Surveillance Target Attack Radar System (JSTARS) Ground Station Module/Common Ground Station (GSM/CGS)

Modernized Imagery Exploitation System (MIES)

Tactical Aircraft Mission Planning System (TAMPS)

Tactical Exploitation Group (TEG)

Tactical Exploitation System (TES)

Theater Battle Management Core System (TBMCS)

TROJAN Special Purpose Integrated Remote Intelligence Terminal (SPIRIT) II

The TCS will export and disseminate UAV imagery products, tactical communication messages, as well as mission plans and target coordinates. The TCS also will receive, process and display tasking orders and operational information from Service-specific mission planning systems.

1.2.3 ASAS RWS V1 Rel RW2.1.1 System Overview.

The All Source Analysis System **(**ASAS) supports the warfighting commander's battle management and information warfare process by rapidly processing and correlating large volumes of combat information and sensor reports from all available sources to produce a fused, all source picture of the battlefield and provide timely and accurate targeting information, intelligence products, and threat alerts. ASAS supports the Military Intelligence (MI) commander and intelligence staff officers in performing the Intelligence Electronic Warfare (IEW) mission requirements of the intelligence organizations and staff elements at Battalion, Armored Cavalry Regiment (ACR)/Separate Brigade, Maneuver Brigade, Division, Corps, and Echelons Above Corps (EAC). ASAS provides automated intelligence and information management, including interface data handling, to couple IEW sensors, preprocessors, the ASAS, and the Army Battle Command System (ABCS), to meet time and accuracy requirements for decision support and Information Warfare planning and execution.

Army forces will fight as part of joint task forces. ASAS has the capability to interface with the

automated C2 and intelligence processors of the joint task force and components, over tactical area communications. This permits military intelligence units and Army intelligence staffs to respond to intelligence tasking, requests for information, and priority intelligence requirements of higher, adjacent, and supporting commands.

ASAS operates in the system high security mode of operation and processes both collateral and Sensitive Compartmented Information (SCI). The system interfaces with standard Army communications systems as well as IEW special purpose communications systems, (e.g. Joint Worldwide Intelligence Communications System, Trojan Spirit and Commander's Tactical Terminal); provides the capability to process General Service and Defense Special Security Communications System record message traffic; and able to simultaneously maintain both SCI and collateral interfaces. The objective system (Block III) will be capable of operating in the multi-level security mode of operation and support direct computer-to-computer data exchanges across the Defense Integrated Secure Network (DISN), Area Common User System (ACUS) and Intelligence Special Purpose Communications at both the collateral and SCI levels.

1.2.3.1 Software.

The ASAS RWS V1 consists of two networked, Common Hardware and Software, Block II Common Hardware/Software (CHS II), fully militarized, tactically deployable, or commercial equivalent, Automated Data Processing (ADP) systems. The ASAS RWS V1 software uses the CHS II (SUN SPARC 20) with a minimum of 64 Megabytes of RAM, and 2.0 Gigabytes of external storage. Military units with less capable systems may be able to run the software as needed (e.g., on SPARC-2 or SPARC-10 platforms).

The ASAS RWS V1 application was developed in GNU ANSI "C", and requires the SUN 4.1.3 UNIX Operating System, and Oracle Database Management System Version 7.1.3.0.0. The graphics support is provided by X-Windows System R5, and Motif 1.2.3, using a GX graphics card or equivalent.

The ASAS RWS V1 software application satisfies two main functions. First, it is designed to concurrently receive, process, and transmit messages. Second, it provides the ASAS RWS V1 analyst with the automation required for data processing, analysis, database management, and automated reporting. The ASAS RWS V1 software application also provides graphical interface mapping tools and other interactive tools to analyze, display and report the current enemy situation. The ASAS RWS V1 software provides utilities to send electronic mail to other ABCS nodes over the Ethernet Local Area Network (LAN) and MSE network.

1.3 Document Overview.

The purpose of this IDD is to provide the interface description between the TCS and ASAS RWS V1 Rel RW2.1.1. This document was developed using MIL-STD-498 (Data Item Description DI-IPSC-84136) as a guide, and is divided into the following sections:

Section 1	Scope: Provides identification of the systems, interfacing entities, and interfaces which are addressed in this IDD, and it gives a brief overview of these systems.
Section 2	Referenced Documents: Lists all referenced documents applicable to this development effort.
Section 3	Interface Design: Identifies and describes the characteristics of the interface(s) defined in this IDD.
Section 4	Requirements Traceability and Qualification Provisions: Defines the requirements traceability as they apply to the ORD and also defines the qualification methods which are used to ensure that the requirements of this interface have been met.
Section 5	Notes: Provides background information regarding the specific C^4I system addressed; and a list of acronyms and abbreviations used in this IDD.
Appendices	As applicable to provide referenced data.

2. Referenced Documents.

2.1 Government Documents.

The following documents of the exact issue shown form part of this IDD to the extent specified herein. In the event of conflict between the documents referenced herein and the content of this IDD, the content of this IDD will be considered a superseding requirement.

2.1.1 Specifications.

Tactical Control System / Subsystem Specification (TCS 102) (Version 1.0)
30 June1997

Software Requirements Specification (TCS 103) (Version 1.1)
1 August1997

Operational Requirements Document for the Unmanned Aerial Vehicle Tactical Control System (JROC 011-97) (Version 5.0)
3 February 1997

2.1.2 Standards.

Federal

Federal Standard 1041	X.25 Standard

Military

MIL-STD-498 5 December 1994	Software Development and Documentation Standard
MIL-STD-2500A 12 October 1994	National Imagery Transmission Format Standard (Ver 2.0)
MIL-STD-1777 12 August 1983	Internet Protocol (IP) Standard
MIL-STD-1778 26 August 1983	Transmission Control Protocol (TCP) Standard

MIL-STD-1780 10 May 1984	File Transfer Protocol (FTP) Standard

Other Government Agency

USMTF 93 JCS Pub 6-04 1 January 1993	U.S. Message Text Formatting Program Description of Message Text Formatting Program
ACCS-A3-500-004 28 May 1993	Army Command & Control System Message Catalog
IEW COMCAT July 1990	IEW Character Oriented Message Catalog

2.1.3 Drawings.

None

2.1.4 Other Publications.

Reports

NSWCDD/96-XX 9 Dec. 1996	Operational Concept Document for the TCS (Draft)
JTA Version 1.0 22 August 1997	Department Of Defense Joint Technical Architecture
MSE-001 ICD 16 October 1987	Mobile Subscriber Equipment Interface Control Document
TCS to TCIM IDD/225 Draft 5 September 1997	Interface Design Description for TCS to TCIM

Regulations

None

Handbooks

CIGSS-Hdbk Version 1.0 19 July 1995	CIGSS Acquisition Standards Handbook
DGCS-HDBK Version 1.0 31 July 1997	DCGS Acquisition Handbook
MIL-HDBK-1300A 12 October 1994	National Imagery Transmission Format

Field Manuals

FM 34-25-3 3 October 1995	All-Source Analysis System and the Analysis and Control Element

Bulletins

None

Plans

TIDP Reissue 2 August 1996	Technical Interface Design Plan

2.2 Non-Government Documents.

The following documents of the exact issue shown form part of this IDD to the extent specified herein. In the event of conflict between the documents referenced herein and the content of this IDD, the content of this IDD will be considered a superseding requirement.

2.2.1 Specifications.

None

2.2.2 Standards.

ISO/IEC 8802-3: 1996 [ANSI/IEEE Standard 802.3, 1996 Edition]	Information technology--Local and metropolitan area networks--Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications [Ethernet Local Area Network (LAN) 10BASE-T Specification]

2.2.3 Drawings.

None

2.2.4 Other Publications.

None

3. Interface Design.

The interfaces between the TCS and the ASAS are of three types: mechanical, electrical, and logical. The mechanical interfaces consist of the cables and connectors that connect the two systems. The electrical interfaces consist of the electrical signals that are exchanged between the systems over the cables. The logical interfaces consist of the formatted and unformatted information that is exchanged between the two systems. The logical interfaces are bi-directional from the TCS to the ASAS. Figure 3.0-1 shows a top-level interface between the TCS and the ASAS. Figure 3.0-2 shows the logical interfaces between the TCS and ASAS. Figure 3.0-3 depicts the mechanical and electrical interfaces between the TCS and ASAS.

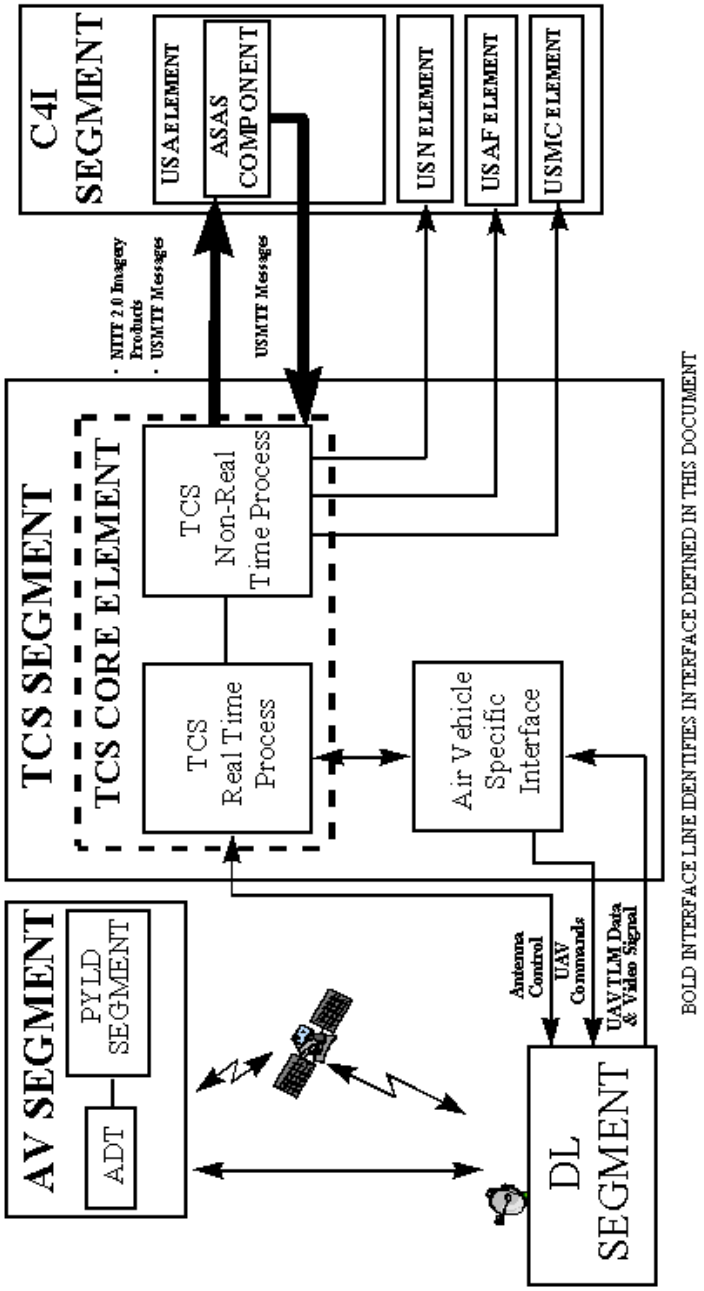


FIGURE 3.0-1 TCS to ASAS Interface Diagram

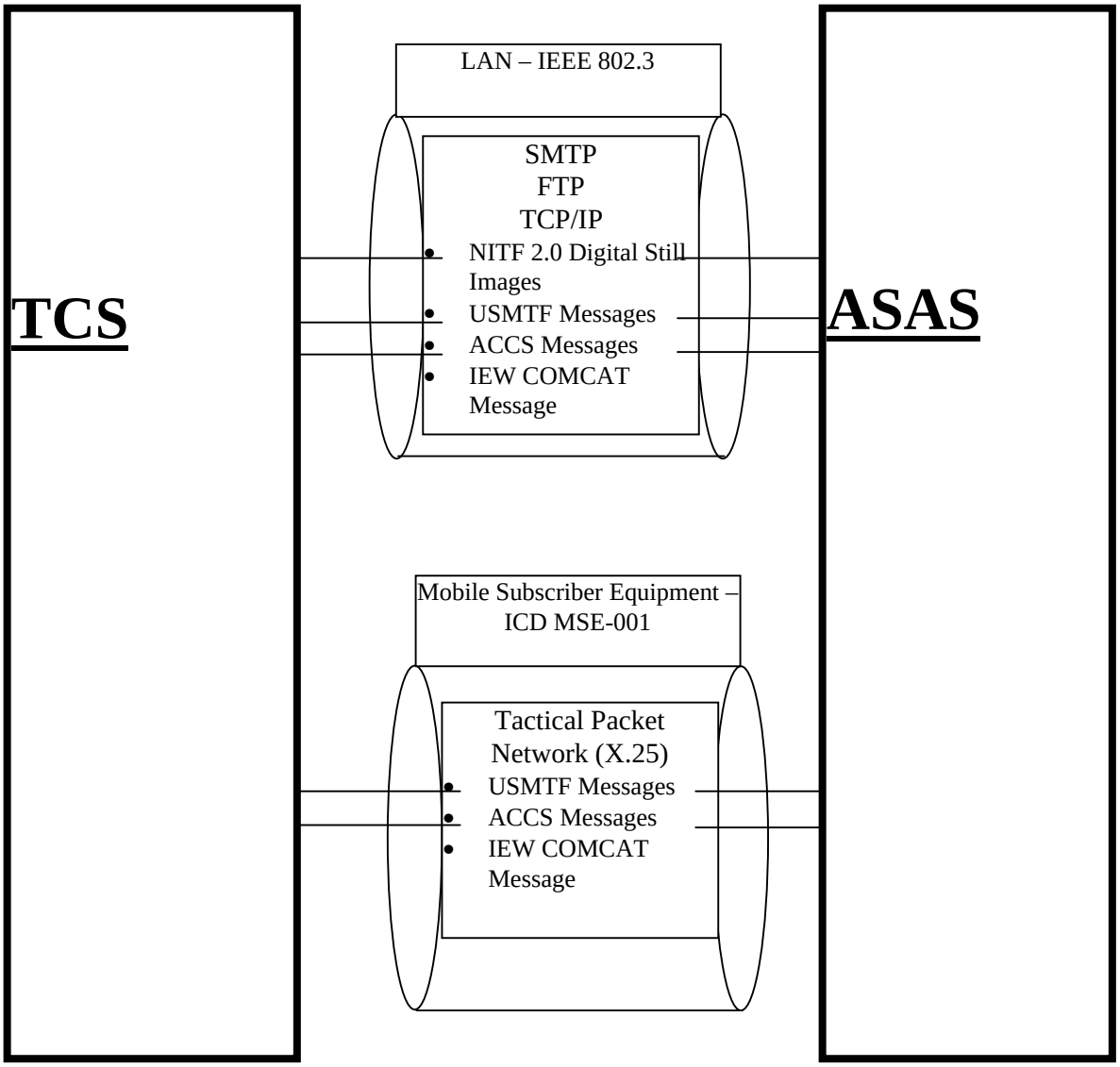
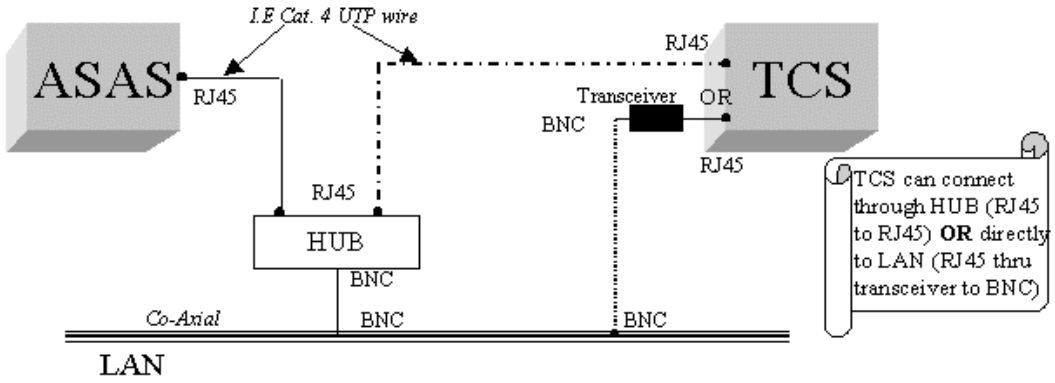


FIGURE 3.0-2 Logical Interface Diagram

LAN Interface



MSE Interface

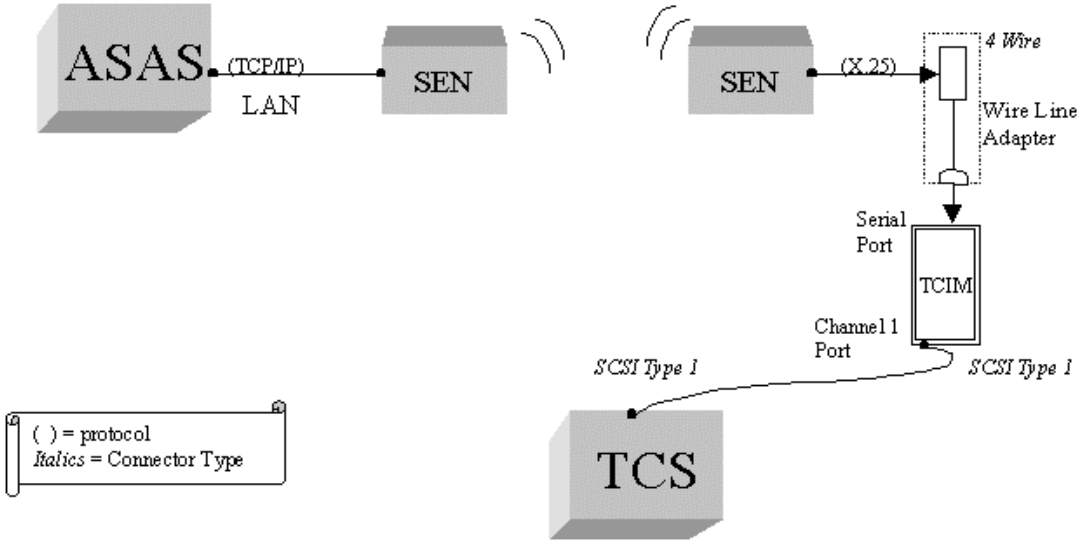


FIGURE 3.0-3 Mechanical and Electrical Interface Diagram

3.1 Interface Identification.

The TCS to ASAS interfaces shall be mechanical, electrical, and logical as defined in this paragraph.

3.1.1 Mechanical Interfaces.

There are two mechanical interfaces between the TCS and the ASAS. If possible, the preferred method is using the LAN interface. If the TCS is remotely located, the MSE interface would be used. See Figure 3.0-3 above for a description of these interfaces

3.1.2 Electrical Interfaces.

The electrical interfaces of the direct cable connection between the TCS and the ASAS shall be per IEEE 802.3, 10BaseT. See Figure 3.0-3 above.

The electrical interfaces of the TCS to ASAS via MSE shall be in accordance with document ICD MSE-001. See Figure 3.0-3 above.

3.1.3 Logical Interfaces.

The logical interfaces between the TCS and the ASAS are an IEEE 802.3 LAN, using the TCP/IP, FTP or SMTP protocols; or via the ICD MSE-001,using the Mobile Subscriber Equipment and the X.25 protocol. See Figure 3.0-2 above.

3.1.3.1 LAN Interface.

When provided, the TCS shall be capable of operating as a member of the unit's IEEE 802.3 LAN within the parameters defined by the ASAS LAN manager.

The ASAS RWS V1 software provides utilities to send electronic mail over the Ethernet LAN via File Transfer Protocol (FTP), Transmission Control Protocal/Internet Protocol (TCP/IP), and Simple Mail Transfer Protocol (SMTP). These protocols will be used to pass NITF 2.0 digital still image video from the TCS to the ASAS. USMTF text messages, IEW COMCAT message, and ACCS messages will be passed via FTP, TCP/IP or SMTP bi-directionally between the ASAS and TCS.

3.1.3.2 MSE Interface.

The ASAS RWS V1 software provides utilities to send data over the MSE via the Tactical Packet Network. This protocol (X.25) will be used to pass USMTF text messages, IEW COMCAT message, and ACCS messages between the ASAS and TCS.

ASAS connectivity to MSE is provided through the switchboard at each Small Extension Node (SEN) which is located near the ASAS site. See TCS to TCIM IDD for details on the TCIM to TCS setup.

3.2 Project Unique Identifier of Interface.

The interface described in this IDD, the TCS to ASAS (RWS), provides a unique method of transferring images e.g. terrain features, land marks, buildings, roads and vehicles plus activities of human beings that are viewed from, and photographed by the UAV. These images and their associated digital data are transmitted from the TCS to the ASAS (RWS) providing the U.S. Army Intelligence Personnel vital information concerning enemy and friendly troop activity.

3.2.1 Priority of Interface.

3.2.1.1 TCS Priority.

TBD

3.2.1.2 Data Link Priority.

N/A

3.2.2 Type of Interface.

TCS will communicate to ASAS in real-time using pre-defined message formats shown in Table 3.2.4-1.

The ASAS Remote Work Station (RWS) V1 consists of a set of Military Intelligence (MI) analysis software applications and tools that focus on the intelligence processes of Army Corps and Divisions. The ASAS RWS V1 provides an automated means to disseminate collateral information, secret and below, directly to the G2 Operations and Plans Section for Intelligence Electronic Warfare (IEW) support to the commander and other staff elements in planning, coordinating, and conducting current and future tactical operations.

The ASAS RWS V1 serves as the IEW message level, United States Message Text Format (USMTF) interface between the ASAS All Source (AS) Component and Maneuver Control System (MCS) as well as the fire support, air defense, and combat support nodes of the Army

Battle Command System (ABCS). The ASAS RWS V1 displays and disseminates the current enemy situation to other ABCS nodes. The ASAS RWS V1 also provides automated and interactive tools that support Intelligence Preparation of the Battlefield and Situation Development**.**

3.2.3 Individual Data Element Characteristics.

The messages listed in Table 3.2.4-1 follow the standard message format described in the USMTF 93, JCS Pub 6-04. The Army unique ACCS messages (*) are described in the Army Command & Control System Message Catalog, ACCS-A3-500-004, dated 28 May 1993. The IEW COMCAT message, MATM, is described in the IEW Character Oriented Message Catalog.

3.2.4 Data Element Assembly Characteristics.

TCS shall support the functions of the required USMTF, IEW COMCAT and ACCS messages for transmission to the ASAS from the TCS and receipt by the ASAS from the TCS as shown in the following table.

TABLE 3.2.4-1 USMTF Messages

*Army Unique ACCS Messages
IEW COMCAT Messages

Msg No.	Identifier	Name	Transmit/ Receive	Function
*S302	FREETEXT	Free Text Message	TR	To provide free text requirements not provided by other messages.
*S303	SALUTE	Size, Activity, Location, Unit, Time, and Equipment	T	Used to report enemy activity observations.
*S301	MAER	Multiple Assets Effective Report	T	Used to report assets effectiveness.
*S304	MASTR	Multiple Asset Status Report	T	Used to report asset status.
C101	RECCEXREP	Reconnaissance Exploitation Report	T	To provide an abbreviated imagery interpretation report format for tactical reporting.
C110	INTREP	Intelligence Report	R	Used to update OB Date Bases
C111	TACREP	Tactical Report	T	To provide perishable information of tactical significance provided for the immediate attention of the tactical commander(s).
C121	TACELINT	Tactical ELINT Report	R	Used to update ELINT OB Data Base on enemy locations.
F014	RI	Request for Information	TR	To request information from other units. It may also be used to request the status of an anticipated response to another request.
F015	RRI	Response to Request for Information	TR	To reply to requests for information. If the information is contained in a previous message, the RRI should reference that Message.
#X014	MATM	Multiple Asset Tasking Message	R	Used to task organic assets.

3.2.5 Communication Methods Characteristics.

Communications between the TCS and ASAS RWS V1 will be provided by the Area Common User System (ACUS)/Mobile Subscriber Equipment (MSE) and the Local Area Network (LAN).

3.2.6 Protocol Characteristics.

In order for two or more devices to communicate successfully, they must speak the same language. What is communicated, how it is communicated, and when it is communicated must conform to some mutually acceptable conventions between the devices involved. These conventions are referred to as a protocol, which may be defined as a set of rules governing the exchange of data between two devices.

To provide backward compatibility to ASAS, the TCS will use the protocols that are currently resident in ASAS. The ASAS RWS V1 software provides utilities to send electronic mail to other ABCS nodes over the Ethernet Local Area Network (LAN) via File Transfer Protocol (FTP), Transmission Control Protocol/Internet Protocol (TCP/IP) and Simple Mail Transfer Protocol (SMTP). Therefore, The TCS to ASAS RWS V1 data link will also use these protocols.

3.2.7 Other Characteristics.

N/A

4. Requirement Traceability and Qualification Provisions.

This section defines the Requirement traceability with respect to the requirement set forth in the ORD and qualification methods to be used to ensure that each requirement of this interface has been met. The C4I requirements, corresponding ORD requirements and the qualification methods are shown in Table 4.0-1

These qualification methods include:

D	Demonstration	The operation of the interfacing entities that relies on observable functional operation not requiring the use of instrumentation, special test equipment or subsequent analysis.
T	Test	The operation of the interfacing entities using instrumentation or special test equipment to collect data for later analysis.
A	Analysis	The processing of accumulated data obtained from other qualification methods. Examples are reduction, interpretation, or extrapolation of test results.
I	Inspection	The visual examination of code, documentation, etc.
S	Special	Any special qualification methods such as special tools, techniques, procedures, facilities and acceptance limits.

Traceability of specific C4I requirements in this IDD, as shown in Table 4.0-1 below, is to the TCS ORD requirements specified in the TCS ORD Version 5.0 Requirement-coded Document dated 7/9/97. Traceability of TCS ORD requirements to the TCS System/Subsystem Specification (SSS), document number TCS 102, has been previously accomplished by the TCS Requirements, Analysis, and Design (RAD) IPT, and is documented in Appendix B (TCS ORD to TCS SSS Requirement Cross-Reference Matrix) of the TCS SSS Version 1.0 dated 30 June 1997.

The requirements listed in Table 4.0-1 shall be verified using the qualification method shown.

TABLE 4.0-1 ASAS Requirements & Qualification Methods

Requirement	ASAS (SW Version)	ORD Requirement Number	Qualification Method
1. Tactical Message (para. 3.2.4)		11, 12, 16, 53, 69,	
a. FREETEXT	ASAS RWS V1 Rel RW2.1.1	70, 109, 110	D
b. SALUTE	ASAS RWS V1 Rel RW2.1.1		D
c. MAER	ASAS RWS V1 Rel RW2.1.1		D
d. MASTR	ASAS RWS V1 Rel RW2.1.1		D
e. RECCEXREP	ASAS RWS V1 Rel RW2.1.1		D
f. INTREP	ASAS RWS V1 Rel RW2.1.1		D
g. TACREP	ASAS RWS V1 Rel RW2.1.1		D
h. TACELINT	ASAS RWS V1 Rel RW2.1.1		D
i. RI	ASAS RWS V1 Rel RW2.1.1		D
j. RRI	ASAS RWS V1 Rel RW2.1.1		D
k. MATM	ASAS RWS V1 Rel RW2.1.1		D
2. Digital Imagery (Still) (para. 3.1.3.1) a. NITF 2.0 (Ethernet LAN)	*ASAS RWS V1 Rel RW2.1.1 uses Image Magic 5D s/w to handle Imagery.	11, 12, 16, 54, 69, 70, 110	D
3. Digital Imagery (Full Motion)	N/A	N/A	N/A
4. Analog Imagery RS-170/NTSC	N/A	N/A	N/A

* The future SW release, “ASAS RWS V1 Rel RW3.0” will be using ELT 3000 to handle imagery.

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5. Notes.

The next ASAS software release (ASAS RWS V1 Rel RW 2.2) is expected in November 1997.

5.1 Background Information.

5.1.1 System Description.

ASAS is the major automated support system for the Intelligence and Electronic Warfare (IEW) functional area of the ABCS. It is a tactically deployable system designed to support management of IEW operations and target development at Battalion, ACR, Maneuver/Separate Brigade, Division, Corps and EAC.

ASAS Block I fielding began 3QFY93 and provided 12 systems for selected priority Division and Corps units and for training and maintenance activities. Each delivered system provided the hardware and software to support the modified Analysis and Control Element (ACE) concept and system software to support the Collateral Workstation (CWS) functional requirements. ASAS Block I fielding was completed 3QFY95.

In ASAS Block II, the ASAS Block I All Source and Single Source functions are integrated as a single enclave and incorporated/combined into the ACE. The ASAS Block I G2-TOC functions, ASAS CWS software capability, are incorporated in ASAS Block II into the ASAS Remote Workstation (RWS). Additionally, ASAS Block II will provide for jump operations to ensure continuity of operations, a dynamic reconfiguration capability to preserve an acceptable level of capability after loss of assets, and an initial secondary imagery dissemination capability. See Appendix B for more information on ASAS Block II.

ASAS Block III enhancements will be in the form of upgraded or new software functionality. Upon completion of the ASAS Block III software enhancements, the ASAS objective system, which meets minimum objective requirements as stated in the Operational Requirements Document, will have been attained. ASAS Blocks IV and V will be implemented as Post-Deployment Software Support efforts.

5.1.2 ASAS Block I.

ASAS Block I consists of two major groupings of enclave equipment, each with different hardware and software baselines. ASAS Block I software combines the appropriate functions: Intelligence Development, Target Development, System Supervision, and Collection Management/Mission Management (CM/MM). Doctrinally, intelligence development includes a wide range of functionality, including Situation Development. The Division and Corps ACE provides highly classified, multi-disciplined intelligence support to the Commander. ASAS

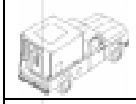
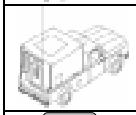
Block I supports the analysis of intelligence requirements, determining mission supportability, tasking appropriate organic sources and electronic warfare platforms, and requesting higher echelon support. Intelligence products from various sensors and sources are integrated, providing the best available picture of the battlefield situation. Based on the Commander's guidance, the Fire Support Element target list, and available intelligence, ASAS supports development of recommendations of targets for fire support activities. The ACE releases collateral and/or SCI to users, as appropriate.

Hardware components for ASAS Block I are defined by enclave as follows:

ACE: All Source (AS) Workstation Computer Graphics (WCG, AN/TYQ-37(V)); Data Processing Sets (DPS, AN/TYQ-36(V)); Communications Control Sets (CCS, AN/TYQ-40(V)); Compartmented ASAS Message Processing System (CAMPS, AN/TYQ-63) (tested separately); and Single Source (SS) WCG, AN/TYQ-52(V).

CWS: Common Hardware/Software (CHS)1 hardware (WCG(2)) and commercial Tektronix Color Printer and Hewlett Packard Laserjet IV Printer. (Per direction of PM Intel Fusion, the ASAS CWS was renamed the ASAS RWS)

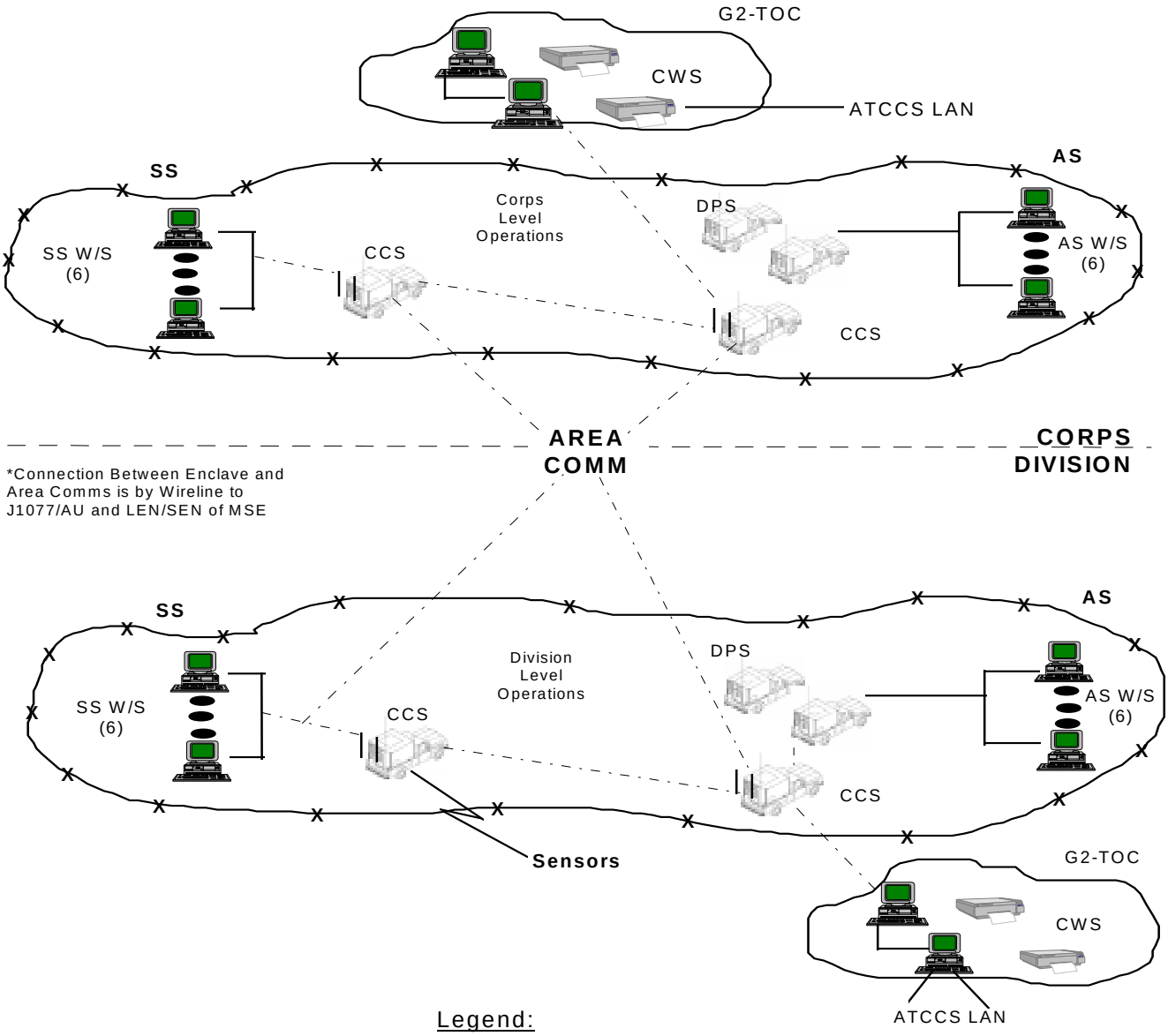
The ACE WCG provides operator interface to the system. ASAS CCS and CAMPS provide communications support for the system. The DPS and other hardware provide processing support. ASAS Block I is designed to interface with the other Army Tactical Command and Control System (ATCCS) Battlefield Functional Areas (BFA) and other interfaces via standard Army area communications, i.e., Combat Net Radio, and the ACUS. For a summary overview of ASAS Block I hardware, see Figure 5.1.3-1 ASAS Block I Components. The organization of these components into enclaves for Division and Corps configurations is shown at Figure 5.1.3-2 ASAS Block I Configurations.

	TRANSPORT	SHELTER	OPERATING SYSTEM	PROCESSOR
 AS W/S AN/TYQ-37(V)	HMMWV	User Provided	DEC VMS	DEC 3800 or DEC Alpha
 DPS AN/TYQ-36(V)	HHV	S-250	DEC VMS	DEC 3800
 CCS AS/TYQ-40(V)	HHV	S-250	DEC VMS	PDP-11/94
 SS W/S AN/TYQ-52(V)	HMMWV	User Provided	UNIX	SPARC 2
 CWS*	User Provided	User Provided	UNIX	CHS I/CHS II
 CAMPS* Secondary Comms	User Provided	User Provided	DOS	INTEL 486

Legend:

CAMPS	Compartmented ASAS Message Processing System		
CCS	Communications Control Set	CWS	Collateral Workstation
CHS	Common Hardware/Software	SS W/S	Single Source Workstation
CUCV	Commercial Utility Cargo Vehicle	AS W/S	All Source Workstation
DPS	Data Processing Set	HMMWV	High Mobility Multi-Purpose Wheeled Vehicle
*Not part of the Materiel Release		HHV	Heavy HHMWV Variant

FIGURE 5.1.2-1 ASAS Block I Components



Legend:

ATCCS	Army Tactical Command & Control System
CCS	Communications Control Set
CWS	Collateral Workstation
DPS	Data Processing Set
LEN	Large Extension Node
MSE	Mobile Subscriber Equipment
SEN	Small Extension Node
SS W/S	Single Source Workstation
AS W/S	All Source Workstation
G2-TOC	G2 Tactical Operations Center

Wireline Comms
Local Area Network
SCI Subsystems

FIGURE 5.1.2-2 ASAS Block I Configurations

5.1.3 ASAS-Extended (ASAS-E).

At the direction of the Vice Chief of Staff of the Army, the Project Manager for Intelligence Fusion initiated ASAS-Extended (ASAS-E) to field ASAS across the military intelligence (MI) active and reserve force. ASAS-E provides Army units not receiving the rugged ASAS Block I with the same software functionality on commercial/Non-Developmental Item hardware. It consists of All Source Alpha RISC Workstations (WCG, AN/TYQ-72(V), Single Source Sparc Workstations or CHS II (WCG, AN/TYQ-73(V) and AN/TYQ-74(V)) and CAMPS, AN/TYQ-63. The ASAS-E configuration is shown at Figure 5.1.4-1 ASAS-Extended Components.

	TRANSPORT	SHELTER	OPERATING SYSTEM	PROCESSOR
 CAMPS AN/TYQ-63	User Provided	User Provided	DOS	INTEL 486
 WCG AN/TYQ-72	HMMWV	User Provided/	Open VMS	ALPHA RISC
 WCG AN/TYQ-73 (RWS) AN/TYQ-74 (SS)	HMMWV	User Provided/	UNIX	SPARC 20 or CHS II

Legend:

CAMPS	Compartmented ASAS Message Processing System
RWS	Remote Workstation
SS	Single Source
WCG	Workstation, Computer Graphics

FIGURE 5.1.3-1 ASAS-Extended Components

5.1.4 Interfaces.

External interfaces between ASAS enclaves/subsystems, other battlefield automated systems, and selected theater/national systems are required to optimize ASAS utility. The ASAS will use Army tactical communications systems for the receipt and transmission of voice/data to interfacing systems. These communications media include the Army Common User System, ultra high frequency and very high frequency radios including Single Channel Ground Airborne Radio System, and direct wire line as well as a capability to connect to Satellite Communications, Trojan Spirit, and the Enhanced Position Location Reporting System or Future Data Radio. Message formatting standards include the U.S. Signals Intelligence Directives (USSID), U.S. Message Text Formats (USMTF) contained in JCS Publication 6-04 (future -

MIL-STD-6040), Army Command and Control System (ACCS) Message Text Formats, External Data Coordination (EDC) and IEW Character Oriented Message Catalog (IEWCOMCAT) unique formats and applicable National Standards (DIA, Central Imagery Office, etc.). The ASAS operates within the three information architectures cited below:

National, Theater, Joint and Service Command, Control, Communications, Computers and Intelligence architectures which provide individual information exchanges with intelligence related systems at those levels.

The Command and Control and Subordinate Systems (C2S2) architecture which will interface ASAS with the other ABCS Battlefield Functional Area (BFA) Control Systems. The ABCS is the implementation of the C2S2 architecture. C2S2 allows information exchanges with all Division/Corps producers of intelligence data (sensors) and consumers of intelligence products not included in C2S2.

The IEW BFA architecture, which is subordinate to the C2S2, provides information exchanges with all division and corps sensors and selected consumers of intelligence products not considered in C2S2.

5.2 Acronyms and Abbreviations.

ABCS	Army Battle Command System
ACE	Analysis and Control Element
ACS/IPF	Guardrail Common Sensor/Aerial Common Sensor/Integrated Processing Facility
ACUS	Army Common User System
ADOCS	Automated Deep Operations Co-ordination System
ADT	Air Data Terminal
AFATDS	Advanced Field Artillery Tactical Data System
AFMSS	Air Force Mission Support System
AMPS	Army Mission Planning System
AS	All Source
ASAS	All Source Analysis System
ASD	Assistant Secretary of Defense
ATCCS	Army Tactical Command and Control System
ATHS	Automated Target Hand-off System
ATWCS	Advanced Tactical Weapons Control Station
AUTODIN	Automatic Digital Network
BDA	Battle Damage Assessment
CAMPS	Compartmented ASAS Message Processing System
CARS	Contingency Airborne Reconnaissance System
CCS	Communications Control Set
CCTV	Closed Circuit Television
CIGSS	Common Imagery Ground /Surface System
CNR	Combat Net Radio
COM	Character-Oriented Message
COMCAT	Character-Oriented Message Catalog
COMPSS	Common Operational Modeling, Planning, and Simulation System
COMSEC	Communications Security
COSIP	Computer Open Systems Interface Processor
COTS	Commercial Off The Shelf
CPS	Communications Processing Subsystem
CSMA/CD	Carrier Sense Multiple Access with Collision Detection
CSP	Communication Support Processor
CUBIC	Common User Baseline Intelligence Community
CWS	Collateral Workstation
C4I	Command, Control, Communication, Computers, and Intelligence
DCT	Digital Communications Terminal
DDCMP	Digital Data Communications Message Protocol
DID	Data Item Description

DII/COE	Defense Information Infrastructure / Common Operating Environment
DIV XXI	Division Twenty One
DNVT	Digital Non Secure Voice Telephone
DoD	Department of Defense
DPS	Data Processing Sets
DSVT	Digital Secure Voice Telephone
ELINT	Electronic Intelligence
EMI	Electromagnetic Interference
ETRAC	Enhanced Tactical Radar Correlator
FISC	Forward Sensor Interface and Control
FM	Frequency Modulation
FOMAU	Fiber Optic Media Access Unit
FREETEXT	Free Text
FTP	File Transfer Protocol
HAE	High Altitude Endurance
HCI	Human-Computer Interface
HMMWV	High-Mobility Multi-Purpose Wheel Vehicle
IAS	Intelligence Analysis System
ICOM	Integrated Communications Module
IDD	Interface Design Description
IEW	Intelligence and Electronic Warfare
IMTS	Initial Main Text Sets
INTREP	Intelligence Report
IP	Internet Protocol
IRS	Interface Requirements Specification
JDISS	Joint Deployable Intelligence
JMCIS	Joint Maritime Command Information System
JMF	Joint Message Format
JSIPS-AF	Joint Service Imagery Processing System-Air Force
JSIPS-N	Joint Service Imagery Processing System-Navy
JSTARS GSM/CGS	Joint Standoff Target Attack Radar System Ground Station Module/Common Ground Station
JTA	Joint Technical Architecture
JTC/SIL	Joint Technology Center/System Integration Laboratory
JTT	Joint Tactical Terminal
LAN	Local Area Network
LEN	Large Extension Node
LRIP	Low Rate Initial Production

MAE	Medium Altitude Endurance
MAER	Multiple Assets Effective Report
MASTR	Multiple Asset Status Report
MATM	Multiple Asset Tasking Message
MIES	Modernized Imagery Exploitation System
MPN	MSE Packet Switching Network
MPT	Man-Pack Terminal
MSE	Mobile Subscriber Equipment
NITF	National Imagery Transmission Format
NRT	Near Real Time
OB	Order of Battle
RECCEXREP	Reconnaissance Exploitation Report
RI	Request for Information
RRI	Response to Request for Information
RWS	Remote Workstation
SALUTE	Size, Activity, Location, Unit, Time, Equipment
SCI	Sensitive Compartmented Information
SCSI	Small Computer System Interconnect
SEN	Small Extension Node
SEP	Signal Entry Panel
SICPS	Standardized Integrated Command Post System
SID	Secondary Imagery Dissemination
SIGINT	Signal Intelligence
SINCGARS	Single-Channel Ground and Airborne Radio System
SMTP	Simple Mail Transfer Protocol
SPIRIT II	TROJAN Special Purpose Integrated Remote Intelligence Terminal
SS	Single Source
SSS	System/Subsystem Specification
TACELINT	Tactical ELINT Report
TACREP	Tactical Report
TAMPS	Tactical Aircraft Mission Planning System
TBMCS	Theater Battle Management Core System
TCIM	Tactical Communications Interface Module
TCP	Transmission Control Protocol
TCS	Tactical Control System
TEG	Tactical Exploitation Group
TF XXI	Task Force Twenty One
TPN	Tactical Packet Network
TIP	Tent Interface Panel
TUAV	Tactical Unmanned Aerial Vehicle

UAV	Unmanned Aerial Vehicle
UAV JPO	Unmanned Aerial Vehicle Joint Project Office
URO	User Readout
USMTF	United States Message Text Format
UTP	Unshielded Twisted Pair
VHF	Very High Frequency
VMF	Variable Message Format
WL	Warlord

APPENDIX A

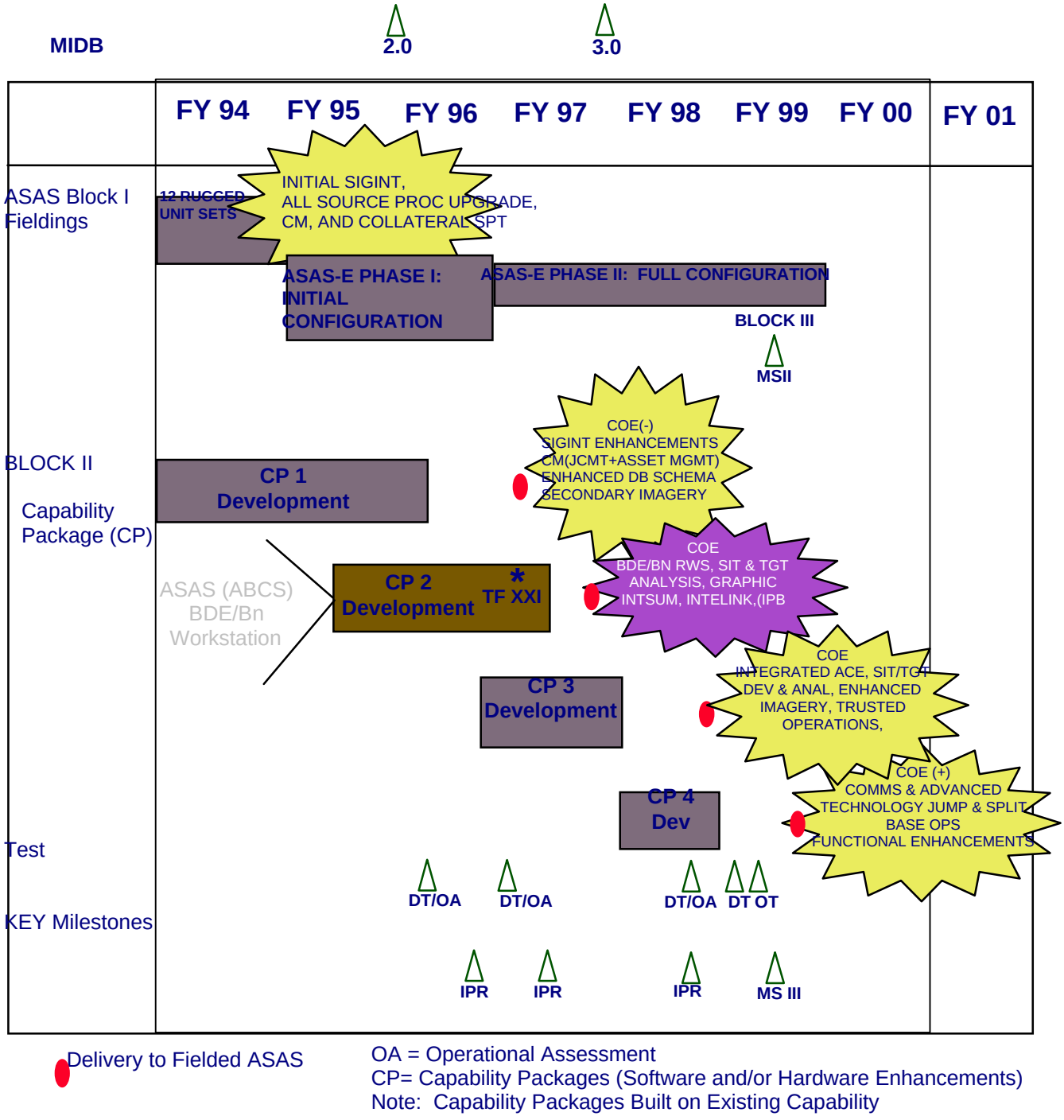
ASAS Planned Upgrades

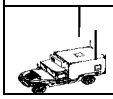
ASAS Block II. The ASAS Block II will provide for multiple phased capability package (CP) deliveries. Each CP will be used to upgrade the fielded ASAS. This incremental and iterative evolutionary approach will expedite the availability of critical functionality to the user. An appropriate level of integrated test and evaluation will occur prior to the CP being incorporated into fielded ASAS. See Figure B-1 ASAS Block II – Major Milestones.

The ASAS Block II incorporates the open hardware and software of the common hardware/software developed by Product Manager CHS and from the Defense Information Infrastructure (DII) Common Operating Environment (COE).

The CHS II based CCS consolidates all communications capabilities into a single module and upgrades the ASAS Block I CCS. A Remote Workstation (RWS) with one WCG and communications capability is also provided. The CCS and the RWS will use the High Mobility Multipurpose Wheeled Vehicle Heavy Variant (HMMWV-HV) and Lightweight Multipurpose Shelters (LMS). The Block I Workstation and the data processing functions of the Block I DPS are replaced by the PM CHS developed Workstation Computer Graphics (WCG) components mounted in and operated from transit cases, which will perform all the Block II data processing functions. The Block II G2-Remote Workstations (G2-RWS), formerly identified as the G2-TOC subsystem, will consist of two CHS II workstations. For a summary overview of ASAS Block II components, see Figure B-2 ASAS Block II Components. ASAS Block II configurations are shown at Figure B-3 ASAS Block II Configurations.

FIGURE A-1 ASAS Block II – Major Milestones

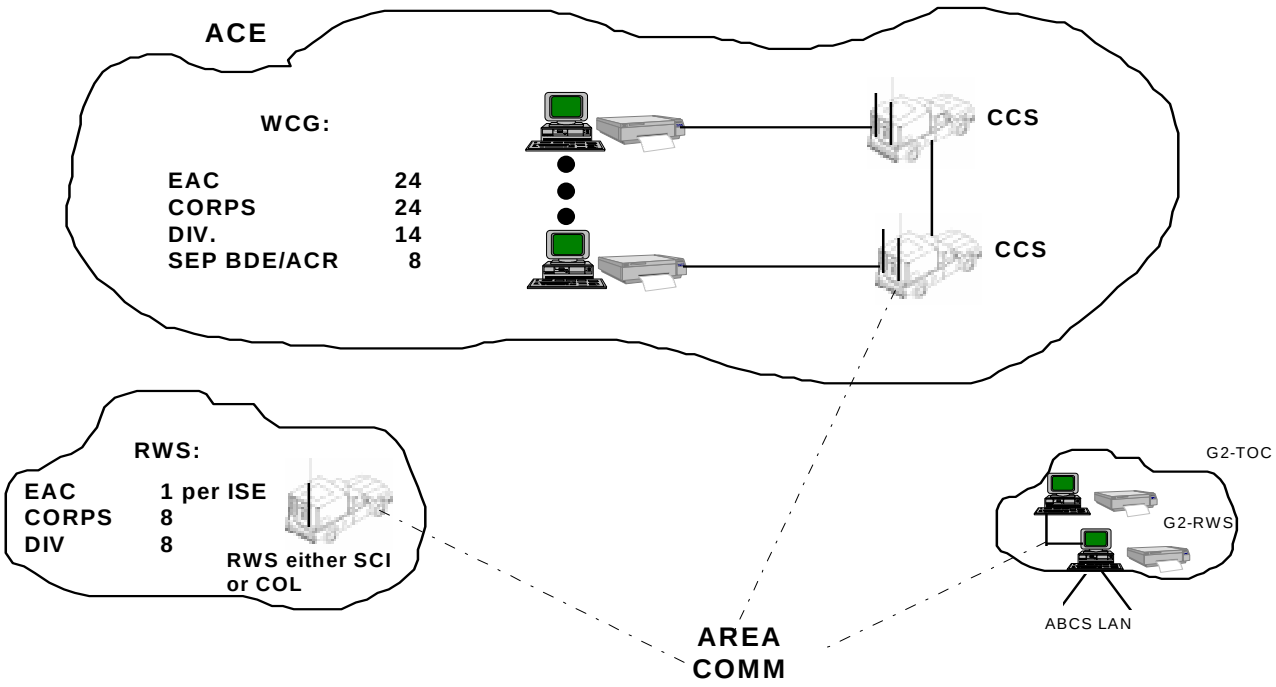

MIDB
2.0
3.0
FY 94
FY 95
FY 96
FY 97
FY 98
FY 99
FY 00
FY 01
ASAS Block I Fieldings
13 RUGGED UNIT SETS
INITIAL SIGINT, ALL SOURCE PROC UPGRADE, CM, AND COLLATERAL SPT
ASAS-E PHASE I: INITIAL CONFIGURATION
ASAS-E PHASE II: FULL CONFIGURATION
BLOCK III
MSII
BLOCK II
Capability Package (CP)
CP 1 Development
COE(-) SIGINT ENHANCEMENTS CM(JCMT+ASSET MGMT) ENHANCED DB SCHEMA SECONDARY IMAGERY
ASAS (ABCS) BDE/Bn Workstation
CP 2 Development
* TF XXI
COE BDE/BN RWS, SIT & TGT ANALYSIS, GRAPHIC INTSUM, INTELINK,(IPB
CP 3 Development
COE INTEGRATED ACE, SIT/TGT DEV & ANAL, ENHANCED IMAGERY, TRUSTED OPERATIONS,
CP 4 Dev
COE (+) COMMS & ADVANCED TECHNOLOGY JUMP & SPLIT BASE OPS FUNCTIONAL ENHANCEMENTS
Test
KEY Milestones
DT/OA
DT/OA
DT/OA
DT OT
IPR
IPR
IPR
MS III
Delivery to Fielded ASAS
OA = Operational Assessment
CP= Capability Packages (Software and/or Hardware Enhancements)
Note: Capability Packages Built on Existing Capability

	TRANSPORT	SHELTER	OPERATING SYSTEM	PROCESSOR
 CHS WCG	HMMWV	USER PROVIDED	UNIX	CHS II HCU
 CCS AN/TYQ-40(V)	HHV	SICPS	UNIX	CHS II HCU/LCU
 G2-RWS (formerly G2-TOC W/S)	USER PROVIDED	USER PROVIDED	UNIX	CHS II
 RWS	HHV	SICPS	UNIX	CHS II HCU/LCU

Legend:

CCS	Communications Control Set	LCU	Lightweight Computer Unit
CHS II	Common Hardware/Software Version II	RWS	Remote Workstation
G2-TOC W/S	G2-TOC Workstation	SICPS	Standardized Integrated Command Post System
HCU	High Capacity Computer Unit		
HHV	HMMWV Heavy Variant	TOC	Tactical Operations Center
HMMWV	High Mobility Multipurpose Wheeled Vehicle	WCG	Workstation, Computer Graphics

FIGURE A-2 ASAS Block II Components



Legend:

ACE	Analysis & Control Element
ACR	Armored Cavalry Regiment
ABCS	Army Battle Command System
CCS	Communications Control Set
EAC	Echelons Above Corps
G2 RWS	G2 Remote Workstation
ISE	Intelligence Support Element
RWS	Remote Workstation
SEP BDE	Separate Brigade
WCG	Workstation, Computer Graphics
G2 TOC	G2 Tactical Operations Center

SCI Subsystems — Local Area Network ——— Wireline Comms – - – - -

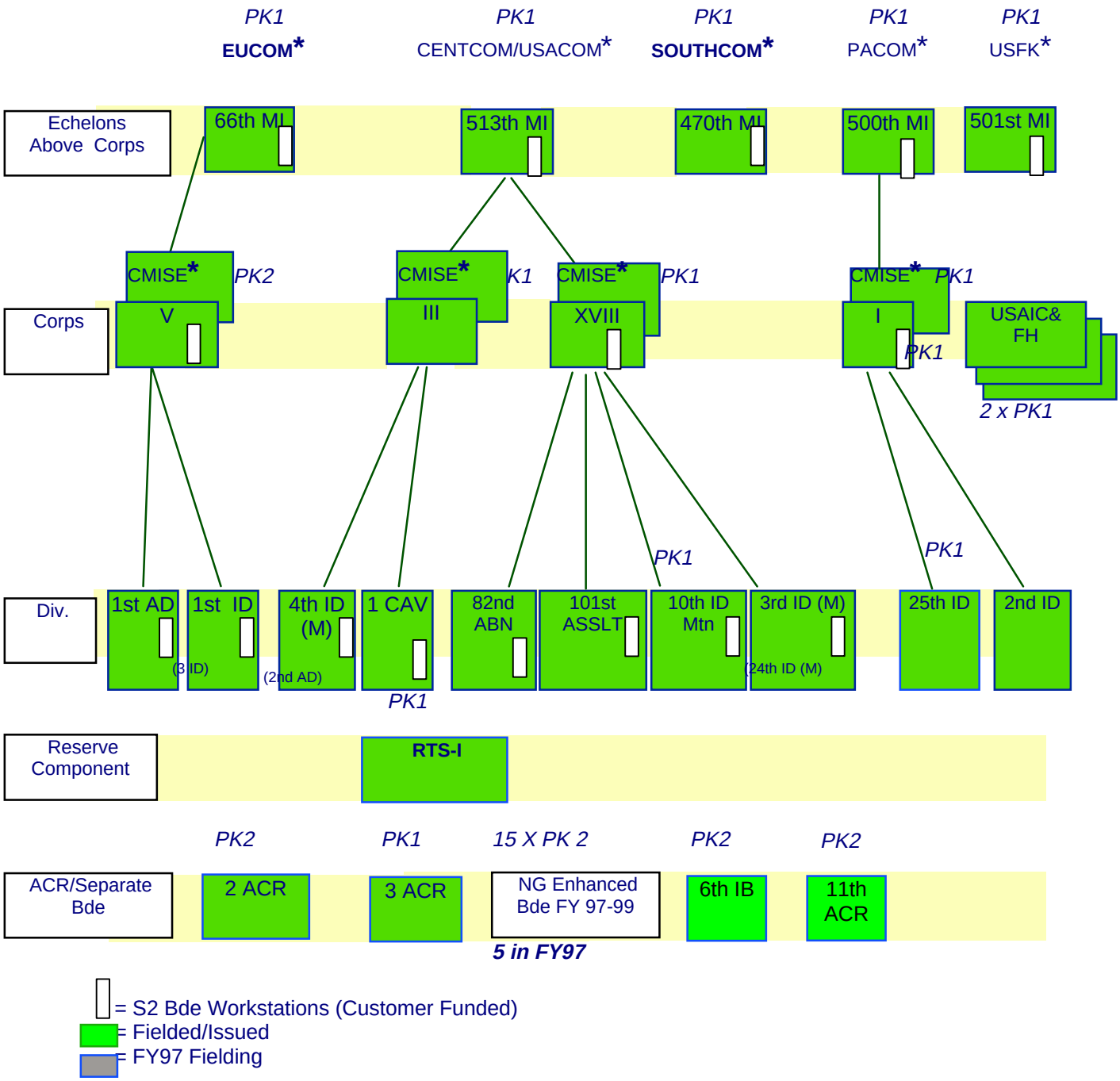
FIGURE A-3 ASAS Block II Configurations

The complete ASAS Block II software configuration (ASAS Version 3.x) will retain all functionality from ASAS Block I, modified to provide a fully integrated configuration. ASAS Block II software development will include automatic security release mechanisms, a degraded mode, jump capability, Collection Management functionality, and increased capability, performance and flexibility in system operations and diagnostics. The use of the DII COE compliant secure operating system will help to meet Defense Intelligence Agency security requirements for system accreditation. ASAS Block II software will also include a system services layer based on the DII COE architecture.

(Per direction of PM Intel Fusion, the ASAS CWS was renamed the ASAS RWS)

See Figure A-4 for current and planned ASAS fieldings.

FIGURE A-4 Current and Planned ASAS Fieldings



* INSCOM Procured Hardware
PK1 (ASAS-Extended) = 5 SCI + 2 Collateral Workstations and NDI Comms
PK2 (ASAS-Extended) = 2 Collateral Workstations (for NG add STU III)